

REMARKS

The Office Action in the above-identified application has been carefully considered and this amendment has been presented to place this application in condition for allowance. Accordingly, reexamination and reconsideration of this application are respectfully requested.

Claims 1-2, 4-9, and 11-13 and 24-25 are in the present application. It is submitted that these claims were patentably distinct over the prior art cited by the Examiner, and that these claims were in full compliance with the requirements of 35 U.S.C. § 112. The changes to the claims, as presented herein, are not made for the purpose of patentability within the meaning of 35 U.S.C. sections 101, 102, 103 or 112. Rather, these changes are made simply for clarification and to round out the scope of protection to which Applicants are entitled. Claims 3 and 10 are canceled.

Claims 1-13 and 24-25 were rejected under 35 U.S.C. § 112, first paragraph, for lack of an enabling disclosure. Specifically, claims 1 and 24 were rejected for the limitation of “using weighting coefficients of a table provided at the outset for each block area in a sub-band generated by the wavelet transform.” In conformance with the Examiner’s comments, Applicants have amended this limitation to read “using weighting coefficients of a table for each sub-band generated at the time of the wavelet transform,” which exactly matches the language in the specification (for example, at page 9). Claims 7 and 25 were rejected for a similar limitation which has likewise been amended. Accordingly, Applicants believe this rejection has been overcome.

Claims 1–3, 5-10, 12-13, and 24-25 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ogata et. al. (U.S. Patent 5,926,791) in view of Chiu et al. (U.S. Patent 6,229,926) and Ribas-Corbera et al. (U.S. Patent 6,111,991).

The present invention advantageously combines aspects of wavelet transform processing (which operates on filtered frequency sub-bands of an image) and JPEG/MPEG compression (which operates on block areas of an image). Specifically, the present invention performs a wavelet transform to “generat[e] wavelet transform coefficients for a plurality of sub-bands,” “quantiz[es] wavelet transform coefficients for each sub-band,” and entropy encodes the quantized coefficients “in units of block areas.” (Claims 1, 7, 24, and 25) A second aspect of the invention is the image data is processed as soon as enough data is stored in memory to perform the processing. In this manner, block areas and sub-band are processed each time that amount of data is ready in memory rather than waiting for the entire image or a tile of the image to be processed. A third aspect of the invention is the use of “a table of weighting coefficients for each sub-band generated at the time of the wavelet transform.” (Claims 1, 7, 24, and 25)

The Examiner contends these features are met by a combination of the Ogata, Chiu, and Ribas-Corbera references. While each of these references does disclose various related features, none of the references meets the limitation of “a table of weighting coefficients for each sub-band generated at the time of the wavelet transform.” The Examiner argues Ribas-Corbera meets this limitation because it teaches the use of weighting factors based on the energy values in block areas of the image to optimize the quantization coefficients. (Office Action page 8) However, Ribas-Corbera’s weighting factors are not even disclosed as being in a table. Further, Ribas-Corbera’s weighting factors are based on the energy value of a block area and are not related to sub-bands generated by a wavelet transform process. In addition, although both Ribas-

Corbera and the present invention use the weighting coefficients to optimize the encoded picture quality, they do so in entirely different ways. Specifically, Ribas-Corbera's weighting coefficients are used to optimize the target number of bits for a block area of the encoded image; whereas the present invention's table adjusts the number of bits for a frequency sub-band of the image.

Moreover, Applicants believe none of the cited references directly teaches or suggests processing block areas of sub-bands as required in the present claims. In fact, Chui does precisely the reverse process of performing a wavelet transform on a tiled image rather than wavelet transforming the image and then block area processing. Ogata splits the image into bands, but quantizes the data in one-dimensional arrays rather than in block areas as required in the present invention.

Accordingly, for at least these reasons, Ogata, Chiu and Ribas-Corbera fail to obviate the present invention and the rejected claims should now be allowed.

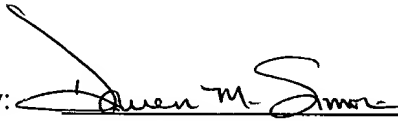
Claims 4 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ogata in view of Chiu and Ribas-Corbera and further in view of Keith et al. (U.S. Patent 5,881,176). However, Keith is relied upon solely to meet limitations in dependent claims 4 and 11. However, since the rejected dependent claims inherit the limitations of independent claims 1 and 7, the rejection based on the additional reference to Keith should be withdrawn in view of the foregoing discussion.

In view of the foregoing amendment and remarks, it is respectfully submitted that the application as now presented is in condition for allowance. Early and favorable reconsideration of the application are respectfully requested.

No additional fees are deemed to be required for the filing of this amendment, but if such are required, the Examiner is hereby authorized to charge any insufficient fees or credit any overpayment associated with the above-identified application to Deposit Account No. 50-0320.

If any issues remain, or if the Examiner has any further suggestions, he/she is invited to call the undersigned at the telephone number provided below. The Examiner's consideration of this matter is gratefully acknowledged.

Respectfully submitted,
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